

# Editorial

## The Fluoride Controversy: The First Forty Years

Where I live, the citizens are too wise to tolerate the addition of fluoride to their drinking water (according to them), or too dumb to know what is good for them (according to others). Why, after forty years, has society become polarized into these two hostile camps?

Fluoride was first added to drinking water in Grand Rapids, Michigan, forty-four years ago. In the past, most medical issues have been resolved in about forty years (two generations). Perhaps with the increasing size, complexity and power of modern establishments, it will require sixty years to resolve serious issues. The increased ease of communication has not increased the rapidity with which ideas are accepted. On the contrary, it has solidified the power of established ideas and inhibited improvements in our over-all health. Perhaps the main issue is not the debate about the scientific evidence pro and con, but the political debate. This is examined in a review in *Chemical and Engineering News*, August 1, 1988. There, J. M. Warren, senior staff attorney with the Natural Resources Defence Council (U.S.A.) is quoted, "... neither side has given the other one rational moment."

Fluoridation supporters claim it prevents tooth decay with minimal or no health risks. They are led by professional people speaking through professional organizations like dental associations, medical associations, public health officials and, I suppose, representatives of the fluoride establishment — those who sell and service the addition of fluoride. They find their opponents to be lacking in wisdom, fanatic, or even right-wing.

Opponents of fluoridation are equally convinced fluoride is toxic, even in the dosages commonly used and, if it has any benefit, it has been grossly exaggerated. They view the proponents of fluoridation as part of a major conspiracy led by the fluoride establishment whose objective is to dispose of excess fluoride, a by-product

of the chemical industry, by dumping it into our drinking water.

Bette Hileman, in her report on fluoridation in *Chemical and Engineering News*, examines these issues, i.e. Does fluoride really decrease tooth decay? Is it really safe? and Does the efficacy warrant the risks to health?

### Efficacy

The American Dental Association claims fluoride reduces the incidence of tooth decay 40 to 65 percent. These conclusions are based upon four studies completed early in the history of the fluoride debate. More recent studies show that, on the contrary, dental caries is reduced very little. Thus, Dr. A. S. Gray, former Director, Division of Dental Health Services, British Columbia Ministry of Health, found that in B.C., where only 11 percent of the population drinks fluoridated water, the average number of decayed, missing and filled permanent teeth is lower than in parts of Canada where 40 to 70 percent drink fluoridated water.

Gray (1987) has been a strong supporter of the view that fluoridation of water is a useful health measure. But in this report he has been realistic. He notes that the caries found in B.C. children around age thirteen are mostly in pits and fissures, as is true of most children in North America. This type is not prevented by fluoride. In B.C., smooth surface caries are infrequent. Further, Gray points out that even if fluoride in water reduced caries by 60 percent, this becomes much less significant when so few fluoride responsive caries are present. The real decrease is closer to 25 percent, which makes the total decrease much less significant. When the average child has four teeth with caries, a 25 percent reduction is less striking than a 60 percent decrease in a population which averages ten cavities per person. Gray credits improved preventive dentistry, the use of fluoride in toothpaste and the

application of fluoride topically as factors. He thus advises his colleagues, "The dental profession should move quickly to develop a new baseline from which to advise communities about the benefits of fluoridation on a scientific basis in step with the changing times."

Perhaps there is a natural drift over the years toward a better state of dental health. Biological phenomena change over time without any known or direct human intervention. The incidence of tuberculosis began to go down long before antibiotics were discovered. In Canada, the U.S., New Zealand, Australia and western Europe, tooth decay rates have declined for the past forty years. These reductions were just as great in non-fluoridated areas. In Queensland, Australia, without fluoridation, the rate is as low as in fluoridated areas of Australia.

Other studies do find some advantage in favour of fluoridation. In 1983, a ten city study in the U.S. showed an advantage of 0.6 fewer cavities per person. But there is no scientific evidence showing there is an optimal dose. A study in Japan found that 0.3 to 0.4 ppm appeared to be best, but with either more or less, the rate of decay was much higher. The old slogan, "two-thirds less tooth decay", is no longer accurate, if it ever was.

If fluoridation were really so effective we would expect to find a corresponding financial benefit. In 1972 a report in the Journal of the American Dental Association found that dental costs were greater than in five comparable unfluoridated cities with the same dental charges.

Proponents have also pointed to the use of fluoride in protecting against osteoporosis and in its treatment. Therapeutic trials have not yielded enough evidence to support this view. Prof. L. V. Avioli, Washington University School of Medicine concluded (see B. Hileman), "Sodium fluoride therapy is accompanied by so many medical complications and side effects that it is hardly worth exploring in depth as a therapeutic mode for postmenopausal osteoporosis since it fails to decrease the propensity toward hip fractures and increases the incidence of stress fractures in the extremities."

### Health Risks

The side effects or toxic reactions which fluoride can cause are: dental fluorosis, skeletal fluorosis, kidney disease, hypersensitivity reactions, enzyme effects, genetic mutations, birth defects and cancer. Proponents claim these risks have all been evaluated fully. But the National Academy of Sciences 1977 report concluded only three potential side effects have been investigated: fluorosis, birth defects and cancer. There is no question that large amounts of fluoride are toxic. Every chemist knows fluoride is a highly potent enzyme poison. But is it also toxic in a so-called 'safe' concentration range? In 1962, the U.S. Public Health Service recommended a range of 0.7 to 1.2 ppm. Lower levels were recommended for hot climates and the higher level for cold countries. Water containing natural levels exceeding twice the recommended levels for the type of climate should be rejected. In 1975 the Environmental Protection Agency (EPA) took over responsibility for regulating contaminants in drinking water. In 1986 it increased permissible levels of natural fluoride to 4 ppm.

In 1963 the U.S. Surgeon General, C. Everett Koop, at the request of the EPA convened an ad hoc committee of world class experts to consider health effects of fluoride. Some of the committee deliberations are reported by Griffiths in the *Medical Tribune*, April 20 and April 27, 1989. In his opening remarks to the ad hoc committee, R. Mecklenburgh, D.D.S., Chief Dental Officer, U.S. Public Health Service, stated "There isn't any group better qualified to come up with a recommendation than the group that is around this table today. It would be hard to refute or overwhelm what this committee in its judgement decides." Yet there is so little scientific information that this committee could not agree on safe limits by age. The draft report stated, "The committee concluded that the fluoride content of drinking water should be no greater than 1.2 to 2.4 ppm for children up to age 9. There was insufficient evidence regarding the fluoride effect on the skeletons of children." The committee also concluded that the age limit for children should be raised to eighteen years because of continuing rapid

bone development to age eighteen.

But the final recommendation was changed to, "It is inadvisable for the fluoride content to be greater than ...," changing *should be* to *inadvisable* made the recommendation optional. The committee's concerns over skeletal and cardiotoxic effects with fluoride levels over 3 ppm did not appear in their final report. Later, the EPA raised permissible levels to 4 ppm. Was this the result of an internal memo from the Office of Management and Budget or the Office of Information and Regulatory Affairs to the EPA (August 7, 1985)? The memo gave estimates that a mandatory regulation would cost the government \$5 million a year to administer for the benefit of a minority of the population. The memo questioned why EPA would impose burdens or costs on everyone in order to deal with a few. A few quotes from committee members:

"I realize that we have few facts and many unknowns." S. Wakllach, M.D., Veterans Administration, Albany, New York.

"I just don't know where the truth is." J. R. Shapiro, M.D., Clinical Center, National Institutes of Health.

"If you are talking about potential toxicity we have no idea whether it is 18 or puberty." M. Kleerkopen, M.D., Henry Ford Hospital, Detroit, Michigan.

"If it were my daughter, I would be concerned." D. W. Rowe, University of Connecticut Health Center, Farmington, Connecticut.

"You have some data on a town in Texas where there were some children with rather severe fluorosis with a level of something like 1.2 ppm in the drinking water." Dr. J. R. Shapiro.

"You would have to have rocks in your head, in my opinion, to allow your child much more than 2 ppm." Dr. W. Rowe. (These six quotations are from Griffiths, 1989.)

It is clear that present safety standards will still allow a large number of people to develop one or more mild to serious toxic side effects, but they are unaware they are being medicated. Thus, about half the population consumes potentially toxic quantities of a poison — fluoride — all their lives, in order to decrease the incidence

of dental caries by one cavity for every two teeth, with no decrease in overall dental costs. In fact, there is probably an overall increase in health costs since the adverse reactions are going to force increased medical costs for diagnosing and treating. To this we must add the direct costs of adding fluoride to water, and the public costs of maintaining the debate.

There is no doubt fluoride can cause a large number of adverse reactions, probably toxic reactions. Elsohn (1988) reported that the list of toxic reactions in the *1983 Physicians Desk Reference* was deleted from subsequent editions. Apparently skin eruptions, gastric distress, headache and weakness promptly disappeared when the 1984 edition appeared.

Dr. G. L. Waldbott treated over 500 patients who reacted adversely even in double blind controlled tests. They suffered muscle weakness, chronic fatigue, excessive thirst, headaches, rashes, joint pain, digestive upsets, tingling in their extremities and decreased mental ability. Other physicians have confirmed these findings.

If the evidence for efficacy and toxicity is so uncertain, why is there still such a public controversy? One reason is that the opponents of fluoridation do not have the same access to the public media, scientific and lay.

Opponents of fluoridation charge that the American Medical Association and the American Dental Association suppress reports of adverse effects. The Washington Bureau Editor of *A GO Impact*, the publication of the Academy of General Dentistry, wrote that supporters of fluoridation are unwilling to release negative information and that organized dentistry has lost its objectivity. Many scientists who have found negative effects agree. Thus, the editor of the *New York State Dental Journal* wrote to a dental surgeon in Australia, "Your paper was read with interest but is not appropriate for publication at this time because the opposition to fluoridation has become virulent again ..." (February 1984). S. L. Marrochia and H. Warner received a similar letter in 1974 from the editor of *Archives of Environmental Health*. Rejection was based on reviewers' criticism such as, "I would recommend

that this paper not be published because this is a sensitive subject and any publication in this area is subject to interpretation by antifluoridation groups."

Prof. P. Granjean, Prof. of Environmental Medicine, Odense University, Denmark, wrote to the EPA (June 1985) about a World Health Organization study on fluorine and fluorides, "... information which could cast any doubt on the advantage of fluoride supplements was left out by the Task Group. Unless I had been present myself, I would have found it hard to believe the not numbered quotations are from B. Hileman's excellent report in *Chem. and Eng. News*."

There is more evidence of selective reporting. R. J. Carton, a scientist at EPA, wrote that EPA's scientific assessment in 1985 "... omits 90% of the literature on mutagenicity, most of which suggests fluoride is a mutagen." In 1982, J. A. Colquhoun, former principal dental officer, Dept. of Health, Auckland, New Zealand, was refused permission to publish a report that fluoridation in New Zealand was without benefit.

There have also been ad hominem attacks on scientists in the antifluoridation camp. Thus, Dr. G. L. Waldbott, an expert on fluoride toxicity was attacked by untrue statements about his research. In 1962 and 1965 the American Dental Association in its journal condemned physicians and scientists opposed to fluoridation by linking them to convicted felons, food faddists, the Ku Klux Klan, and so on. Ralph Nader calls this an institutionalized witch-hunt (Griffiths, 1989).

Of course, editors of referred journals are not free to publish what they wish. This is why the letters to the editor section of journals are more informative and more interesting. Since most referees are establishment experts, experts of the orthodoxy, it is easy to see why ideas they are not familiar with will be kept out of their journals.

### The Future

The issue will be resolved sometime in the next forty years. I have no doubt fluoride will no longer be added to drinking water, and where

natural levels are higher than 1 ppm, it will be removed.

Fluoride-containing tooth paste or drops applied by dentists will be available for personal use. Mass treatment for everyone to produce uncertain benefit in a few will no longer be tolerated. All cities will join my city, Victoria, British Columbia, in providing fluoride-free water to their citizens. I make these predictions by examining the trends. The early findings that fluoride decreased dental caries by 50 percent have not been confirmed. Recent studies suggest that the difference in favour of fluoride has vanished, or is less than one cavity per person. In the same way, early evidence that it is nontoxic is being replaced by much evidence that a large number of toxic reactions are possible and probably occur in many people. These two trends inevitably point to a final resolution of the problem: its removal from drinking water, and the end of this great debate.

Medical associations today should not be faulted because their former officers engaged in unscientific activity in order to further establishment ideas but they should be strongly condemned and called to account for perpetuating these fallacies.

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